

RAIN CLOUDS



TODAY'S CHALLENGE: INLAND WETLANDS

YOU can't overestimate the importance of inland wetlands — of bogs, marshes, swamps, and river meadows. They tame floods, keep rivers flowing in midsummer, restore water to underground reservoirs, and hold the water table where it should be.

The water in your faucet probably seeped through a swamp before it reached your town or private water supply. If the swamp is drained and surfaced with asphalt, the water is more likely to flood your cellar.

If a town upstream locates a dump in a marsh bordering the stream you share, *your* water may taste of iron for the next decade. And if it permits a sand and gravel company to excavate in the flood plain, *your* wells may run dry.

HOW WETLANDS WORK

Bogs, marshes and swamps — giant sponges made of much and specialized plants which can absorb up to 16 or 18 times their weight in water — soak up water fast and re- lease it slowly. The soaking-up helps prevent flash floods downstream. The slow release gives some of the stored water time to sink deep into the ground where it replenishes ground-water supplies, keeps springs bubbling, and fills wells.

Downstream the work of marshes and swamps is supplemented by the wide, wet meadows of the river's flood plain, carved out by recurring floods long before the Pilgrims thought of leaving England. Although flood plains are not as spongy as the other wetlands, they hold and store water more efficiently than cultivated fields or even woods.

SOME CONSEQUENCES OF DESTROYING WETLANDS

When marshes and swamps have been drained, filled and paved, the water they would have absorbed in their natural state rushes downhill over the surface of the earth. This is runoff, and much of it is wasted water — lost to reservoirs, lost to agriculture, useless to industry.

Excess runoff upstream means floods downstream. If the flood plain has not been tampered with, the flood waters will be slowed down and contained. But if the river's right of way has been built upon, the flood rampages on across the flood plain doing high-cost damage to roads, houses, factories, utilities as it races to the ocean.

There is no substitute for natural wetlands in flood control and protection of water resources. In the last 30 years the U. S. Army Corps of Engineers has spent more than four billion dollars on flood control projects. And in the same period the average yearly damage from floods (in terms of the 1960 dollar) has jumped from \$200 million in 1936 to \$700 million at present. Northern Italy is a well-drained and deforested country where hydroelectric dams instead of natural wetlands provide flood control. The dam whose overflow caused such destruction in Florence recently was located eight hours upstream, as flood waters rage, from the city itself.

As for water resources, in water-rich New England the water level of Quabbin, the largest reservoir, is so low that it will take 17 years of average rainfall for it to climb back to normal.

HOW WETLANDS CAN BE PROTECTED

Landowners in some communities such as Concord, Lincoln, and Wayland have taken voluntary action by putting restrictions on the development of their wetlands in the deeds to their property. The restrictions apply not only to the present owners but also to future purchasers, and are accepted as filling the legal requirements by the state's Department of Natural Resources.

Local zoning is another effective protection. Even the Army Corps of Engineers now recommends flood-plain zoning for parts of the Sudbury River instead of the construction of more dams.

Land acquisition by towns and cities can change flood plains from liabilities to assets. Milwaukee began acquiring land along the flood plains of its rivers some years ago and will soon have almost 5000 acres of flood-plain parks and recreation areas. When floods come, the damage will be trifling. In Cincinnati buildings have been torn down and replaced with parks and other useful open places that water cannot damage.

And the states themselves can act. A New Hampshire law protects the wetlands bordering lakes; when a developer flouted it at Squam, he was brought to court and lost the case. And in Massachusetts the Hatch Act theoretically covers *all* inland wetlands, but has no teeth. So neither law is ideal but both are promising starts on a big problem and both indicate New England's awareness of the importance of action at the state level.



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WATER

A FEW DEFINITIONS

SWAMP — a poorly drained land with irregular, permanent or semi-permanent, freshwater or salt water standing surface water. Most swamps are level ground and have low-lying plants. Some swamps, however, and especially salt water swamps, are of the same height, contour and general aspect as the surrounding land.

WETLAND PLANT — any low-lying, trailing, creeping and climbing plant, particularly shrubby. All wetland plants have to have some form of root in the soil. The plant parts above the soil are of the kind used in the soil. The plant parts above the soil are of the kind used in the soil. The plant parts above the soil are of the kind used in the soil.

WATER — what is called just simply "water" as a life with the same properties and uses. Water is present with a lot of water of some kind of the same. Water is present with a lot of water of some kind of the same. Water is present with a lot of water of some kind of the same.

WETLAND — any or several areas that contain water. The ground surface is not the same as the surface of the land. The ground surface is not the same as the surface of the land. The ground surface is not the same as the surface of the land.

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WETLAND PLANT



FLOODED PLAIN



HOW TO MANAGE A MARSH

THE Soil Conservation Service can tell the owners of wetlands how to develop their soggy property for personal fun and profit without impairing its value as the guardian of water. Here are three ideas from the Middlesex Conservation District. Further information and detailed instructions are available from the Service's offices in other counties.

1. Attract nesting ducks and geese by diking and pumping water in. The Massachusetts Audubon Society is doing this with a duck pond at its Ipswich River Sanctuary.
2. Treat yourself and your family to a wildlife pond. Relatively easy to scoop out of the heart of almost any marsh or swamp, it will be a real addition to your property. It will help in flood control, lower the cost of fire insurance for nearby buildings, attract birds, and give everyone good fishing. Suburban wildlife ponds often double as swimming pools in the summer and skating rinks in the winter.
3. Set up your own wildlife sanctuary. Tracts of marsh make ideal study areas for schools, Scouts, and everyone interested in nature study.

Acre for acre, wetlands are the richest natural habitat we have. If you are lucky enough to own some, many government offices — soil conservation, fish and game, agriculture, even water resources — are eager to help you make the most of it.



SUBSIDENCE IN ACTION

BUYER, BEWARE

LIKE second-hand cars, houses built on drained and filled wetlands are apt to give their purchasers some unpleasant surprises.

"Subsidence" cracks mortar, tilts walls out of plumb, and makes floors slope dangerously. The "subsiding" is due to the fact that when peat and muck soils are drained, they shrink and become more compact as they slowly dry. Downward settling sometimes averages three inches a year for four or five years, and shoring-up operations are expensive and not always successful. Recently twelve brick houses in New York were condemned as unsafe because of subsidence — and ordered demolished at their owners' expense.

Another threat is soil pollution. About half of New England wetlands are unsuitable for any building developments involving the use of septic tanks. These wetlands are cradled in bowl-shaped formations of clay or other impermeable material. They never would have become soggy in the first place if rain could penetrate the ground in the normal way. When sewage from septic tanks pours day after day into these natural basins, the bacteria that normally reduce it to harmless sludge drown in the overabundance. Eventually the ground becomes saturated with sewage. Sometimes the effluent seeps into wells and has been known to cause outbreaks of hepatitis. And often, after heavy rains, it bubbles to the surface where it smells like what it is — raw sewage.

Then, of course, there is the familiar nuisance of flooding. This can persist for 50 years or more.

Soil engineers expect that many a house built during the drought will be subject to flooding when the drought ends even though the soil was tested for drainage before building began. The tests, called percolation tests and required in many towns for septic tank permits, tell where the water table is *now*. But they do not give its normal height which could be ten or more feet above the drought level. And this is the gap that will cause flooding.



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